

## Questions 7: Expectation and Correlation

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### Question 1

Let variable  $x$  can have values 1, 2 and 3 with probabilities  $P(1) = 1/5$ ,  $P(2) = 3/5$  and  $P(3) = 1/5$ . What is the expected value of  $x$ ? Compare it with mean value of (1, 2, 2, 2, 3)?

### Question 2

Consider the following sets of values for variables  $x$  and  $y$ :

$x$	$y$
-1	-2
0	0
1	2

Compute the expected values and variances of  $x$  and  $y$ . You can compute them as the means and the mean square deviations. Compare the results. Which variable is more uncertain (risky)?

### Question 3

Compute the covariance and correlation between  $x$  and  $y$  from Question 2:

$x$	$y$
-1	-2
0	0
1	2

Are these variables correlated, uncorrelated or anticorrelated?

### Question 4

Suppose the database contains data for  $m$  independent variables. What should the covariance and the correlation matrices look like?